Abstract of the Disclosure

A half-density ROM embedded DRAM uses hard programmed non-volatile cells and unprogrammed dynamic cells. By hard programming either a first or second memory cell in a pair of cell, different data states are stored. Two word lines are used to access the memory cell pair. Because one of the cells is hard programmed, sense amplifier circuitry identifies the appropriate data state. The ROM cell can be programmed in numerous different manners. For example, ROM cells can be hard programmed by eliminating cell dielectric to short cell plates to a program voltage, or an electrical plug can be fabricated between the cell plates and shorted to a program voltage. In other embodiments, the ROM cell can be programmed using an anti-fuse programming technique, or by providing a high leakage path (not full short) such as through an active area to the substrate.